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Geography Series

GS-0150

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Geography Series

GS-0150

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SERIES DEFINITION

This series includes positions the duties of which involve professional work in the field of geography, including the compilation, synthesis, analysis, interpretation and presentation of information regarding the location, distribution, and interrelationships of and processes of change affecting such natural and human phenomena as the physical features of the earth, climate, plant and animal life, and man's settlements and institutions.

This standard supersedes and is to be substituted for the standard for this series, which was issued in December 1948 under the code of P-150-0.

COVERAGE AND EXCLUSIONS

Geography is the science that observes the phenomena of the earth and attempts to put them into meaningful perspective. "Phenomena" of interest to geography may be natural, or the result of man's activities, and include physical features, such as land forms, rivers, etc.; cultural features, such as settlements, population distribution, etc.; and such phenomena as climate, boundary changes, use of resources, etc. In general, geography wants to know how much of what is where, why it is there, and what its significance is to nature and man. It does this by determining the location and distribution of observable phenomena, by pointing out the differences that exist among things that seem to be alike, by finding out the relationships that exist among the phenomena observed, and by ascertaining the significance these relationships have for nature and man. Subjects of geographic observation include land forms and terrain, natural resources, climate, plant and animal environments, and man's natural and institutional environments. Geography observes these in a space-time continuum which serves as an aid to observation and to understanding of the processes by which such things change.

The interests of geography cut across many subject-matter areas which are the special interest of other disciplines. For example, geology, geodesy and cartography are concerned with specialized aspects of land forms and terrain. Other fields (urban planning, soil conservation, anthropology, sociology, political science, meteorology, etc.) also encompass matters of interest to geographers -- land use, natural resources, man's environment, atmospheric disturbances, etc.

Geography is distinguished from related fields by (1) its primary concern with the spatial-distributional aspects of man's environment or potential environment on the earth's surface; (2) its interdisciplinary interest in the phenomena of the earth; (3) its graphic and taxonomic approach toward observing, recording and presenting geographic information; and (4) its integrative approach toward interpreting and determining the significance of the relationships existing among various phenomena.

The synthesis, analysis and interpretation of geographic information results in (a) information for the production of accurate maps, charts and gazetteers; (b) standardized geographic

nomenclature; (c) studies to show and compare the distribution of phenomena (comparative distribution studies); (d) regional and area studies; and (e) research into the causal relationships and significance of observed features and events.

In distinguishing geographic positions from somewhat similar positions in other series, there are two types of situations which may be encountered.

1. The first situation concerns positions involving geographic work which parallels specializations in other series or which is tangent to work that is specifically within the domain of other series. These are positions which involve work in specialized subject areas (e.g., climatology, geomorphology, and urban geography) that are of interest to geography as well as to other disciplines, but where there are distinguishing differences in approach and techniques that result from training in, and the focus of interest of, the respective discipline. In such cases, geographic positions may look very much like positions which belong in other series, but a distinction, based on approach and job content, can be drawn through careful analysis.

   The following will assist in drawing such distinctions:

   Research is properly classified to this series if it has as its major purpose the understanding and explanation of (a) why things are located and distributed in a certain manner, (b) the significance of such location and distribution to other phenomena (natural and human), and (c) the processes of geographic change. Research not primarily concerned with these factors (for example, research into the fundamental nature of the phenomena) should be classified to the proper physical or social science series.

   For example, research on the nature of solar and reflected terrestrial radiation may be of considerable interest to geographers doing climatologic work; but, work of this kind, depending upon various factors, is likely to be classified in the Meteorology Series, GS-1340, the Physics Series, GS-1310, or the Geophysics Series, GS-1313. However, properly classified to the Geography Series are positions whose incumbents take the findings of meteorologists, physicists or geophysicists regarding the nature of solar and reflected terrestrial radiation, and use such information to understand its distribution and the relationship and significance such radiation has to the resulting manifestations in geographic phenomena.

   As another example, positions primarily concerned with studying, analyzing and understanding the location, the distribution, and the interrelationships of the physical and human phenomena that comprise an urban area are classified in this series. Positions primarily concerned with developing plans, programs, and regulations for the growth and renewal of urban areas -- based upon geographic and other studies, research and findings -- are classified in the Urban Planning Series, GS-0020.

In a manner similar to the examples above, geographic work involving land forms and terrain, climatology, and plant and animal environments is often parallel or tangent to work done in geology, meteorology, botany and zoology.

2. The second situation involves work which may be equally the concern of geography and some other discipline. For example, geography is interested in the impact geographical factors have on such economic activities as mining, manufacturing, forestry, tourism, agriculture, fishing, trade, transportation, etc. Analysis of such impact and the significance of geographic factors to economic endeavors requires varying degrees of economic knowledge in addition to geographic knowledge. Within the profession of Economics, the Regional Economist performs a similar function. Thus, the work may be considered to be "interdisciplinary" -- i.e., as involving, and belonging equally to, more than one discipline.

   In a comparable manner, geographic work may involve working in areas which are on the "disciplinary borders" with cartography, geology, meteorology, statistics, physics, geophysics, anthropology, etc. In determining the series classification of positions involving work which may be the concern of more than one specifically defined discipline or area of endeavor, the principles regarding interdisciplinary positions, which are published under the heading, "Interdisciplinary Professional Positions," in the *Introduction to Position Classification Standards*, should be used.

OCCUPATIONAL INFORMATION

Positions in this series are predominantly engaged in either (1) taxonomic and descriptive work or (2) analytic and interpretive work.

1. Taxonomic and descriptive work involves the assembly and presentation of information concerning the location, nomenclature, and distribution of phenomena, including the differences that exist among things that seem to be alike. This information is used for geographic categorization and designation, for producing maps, charts, and gazetteers, for standardizing geographic nomenclature, and for determining and comparing the distribution of phenomena.

2. Analytic and interpretive work goes beyond scientific observation, collation and reporting of facts. It attempts to understand the relationships existing among various phenomena, to ascertain the significance of the location and distribution of things, and to understand and determine the reasons for geographic change.

Variety of geographic work

The variety of geographic work for which a position in this series may involve responsibility depends upon the features and events being investigated.

Geography is divided into physical geography and human (or cultural) geography. Physical geography is concerned with the physical earth and its resources -- land forms, climate, vegetation, soils, minerals, and water resources. Human geography is concerned with population distribution, the geographic aspects of man's settlements and institutions, and man's use and adaptation of the physical earth and its resources. Given the wide range of both physical and human geography, and the fact that positions, to varying degrees, cut across physical and human geographic lines, neither term in itself is sufficiently definitive to warrant being used as a specialization. The division of geography into physical and human spheres does, however, involve some important basic differences in background and qualifications which are significant from the standpoint of selectively certifying applicants for some positions in this series. (See the qualification standards for Geography Series, GS-0150, in Operating Manual for Qualification Standards for General Schedule Positions.)

Principal areas of geographic emphasis

The principal areas of geographic emphasis are topography, climatology, economic geography, regional geography, political geography, and the study of human settlements. Positions in this series may, and often do, involve working with more than one of these areas of emphasis.

Topography. -- Geographers in the Federal service may be interested in the land forms and terrain of the earth for reasons involving navigation, logistics, intelligence and geographic standardization. Such work involves determining the distribution of land, water, and vegetation; the configuration of the earth's surface including its relief and the location of streams, lakes, cities, roads, etc.; and the changes that take place and the processes involved in the evolution of land forms.

Climatology. -- Geographers may be concerned with the orderly organization and use of particular atmospheric data (temperature, pressure, wind velocity, precipitation, etc.) to describe overall climatic conditions, and to do research into the causes of climatic disturbances and the processes of climatic change, including determining the significance of climatic conditions to such activities as defense, conservation, agriculture, health preservation, transportation, marketing and supply.

Economic geography. -- Economic activities (e.g., mining, manufacturing, forestry, tourism, agriculture, fishing, transportation, commerce, etc.) are considered in the light of such geographic factors as land forms and terrain, land use, natural and human resources, climate, etc. Investigations in this area are done, for example, to determine whether the resources of an area, natural and human, are underdeveloped or underemployed; to determine whether certain economic activities should be continued or can be established on a viable basis; or to determine the most feasible way to put the existing resources of an area to use.

Regional geography. -- Geographers divide the earth into regions and areas. Regions and areas may be designated arbitrarily, but are typically fixed by topographic, climatic, political, economic or socio-cultural conditions. There are two reasons for these divisions: (1) to have a boundary or specific frame of reference when investigating specific geographic features and events, and (2) to examine and understand particular regions and areas geographically. When a particular region or area is the chief topic, as distinguished from specific features and events, intimate knowledge of all significant geographic phenomena in the region or area is necessary. This includes some knowledge of the history, customs and language(s) of the region or area, and awareness of economic, political and social problems.

Political geography. -- Political conditions have an impact on geography and vice versa. Geographers may be concerned with defining and describing area and national boundaries, including political and administrative divisions; and with explaining and interpreting the relationships of geographic conditions to political situations and problems.

Human settlement. -- Among the basic concerns of geographers are how and why people are distributed over the earth's surface. They study the numbers of people and their physical, social, behavioral and economic characteristics as spatially distributed, and the relationship of such distribution to other geographic features. Studies may be done in this area, for example, to determine the physical and human phenomena which comprise an urban area, including consideration of the patterns and density of the population, the functions, types, and distribution of buildings and other artifacts, the availability and use of natural resources, the implication of climate and topography, and the relationships and significance of other geographic factors.

Knowledges and abilities

All geographer positions require basic knowledge of (1) the principles of geography, (2) the general worldwide complexion of physical and human geography, and (3) familiarity with graphic representation of geographic facts. In addition, various knowledges and skills are required to perform work involving various areas of emphasis. These include, for example, (1) knowledge of conditions and developments in a variety of areas of emphasis, (2) intensive knowledge of specific geographic features and events, (3) the ability to read and interpret photographs (especially aerial photographs), and maps and charts of different scales and projections, (4) taxonomic and bibliographic skills, (5) skill in terrain analysis and in making analyses based upon location and distribution theory, (6) the ability to present and illustrate geographic information in written and graphic form, (7) the ability to integrate geographic information for presentation from an area or regional viewpoint, or from the viewpoint of an area of geographic emphasis, (8) the ability to use statistics and statistical methods, i.e., statistical tabulations, frequency studies, probability studies and quantitative analysis, and (9) the ability to use geographic field methods.

TITLING

In recognition of the range and variety of topical subject-matter knowledge which may be required in individual positions, no attempt has been made to establish "fixed" specializations in this series. The title for positions in the series is *Geographer*.

Supervisory positions are not described in this standard although they are included in the series. Significant supervisory duties should be evaluated in accordance with the General Schedule Supervisory Guide. The title *Supervisory Geographer* should be used only when significant supervisory responsibilities requiring specific supervisory qualifications are present. However, neither the technical direction of a small professional staff nor program responsibility necessarily indicates a requirement for specific supervisory qualifications.

EVALUATION OF NONSUPERVISORY GEOGRAPHER POSITIONS

The factors described in this standard are designed to evaluate positions engaged in geographic studies and research. Two factors -- *I, Nature and Scope of Work*, and *II, Level of Responsibility* -- are used in the evaluation of geographer positions. While these factors relate directly to the performance of geographic studies and research, they will assist, when used with other appropriate standards and guides, in distinguishing levels of geographic positions involving consultant, advisory, planning or administrative work.

I. Nature and scope of work

This factor incorporates (A) geographic coverage and (B) complexity of work.

A. *Geographic coverage* is a measure of the combined influence of: (1) the variety of phenomena with which the work is concerned, (2) the size of the area of the earth with which the work is concerned, and (3) the depth to which a subject is being investigated. Since each of these elements varies independently, over a very wide range of values, it is quite possible for a very significant increase (or decrease) in one element to more than offset corresponding decreases (or increases) in the other elements. Thus, a decrease in the size of area covered may be more than offset by an increase in the variety of phenomena studied or in the depth of the study, etc. Typically, analysis and investigation of geographic conditions in depth compensates for a limitation in the variety of features and events or in the size of area covered. On the other hand, taxonomic and descriptive work is more likely to be characterized and measured by the variety of observations and the size of the area of the earth than by depth of investigation. It is therefore possible for a brief staff paper concerning the significance of distribution and the interrelationships existing among a limited variety of phenomena in a small but important river valley to be broader in scope (greater depth) than a lengthy document describing the distribution of population or differences in temperature over a large area.

B. *Complexity of work* is measured by evaluating the difficulties encountered in doing geographic studies and research. Geographic study and research includes the identification, collection, evaluation, synthesis, analysis, interpretation and presentation of geographic information for various purposes. It may also include testing and validating various hypotheses. It involves the use of the existing source material, acquiring new or confirming old information through field study, and examining and/or interpolating data to determine location, distribution, differentiations, interrelationships and distributive processes of geographic fact. In evaluating the complexity of geographic work consider (1) the availability and reliability of source materials, (2) the number and variety of differentiations and relationships which must be ascertained and the extent to which they are novel, and (3) the difficulties encountered in presenting the work.

II. Level of responsibility

The degree to which a geographer is responsible for his work is measured by (a) the nature and amount of supervision received, (b) the extent to which specific instructions, guides, and standard work procedures and techniques are followed, (c) the range of personal work relationships, (d) the extent to which a geographer is viewed as an expert in his area of competence by his agency, and (e) the extent to which his findings are regarded as authoritative by his professional colleagues.

Qualifications required

Although not included in a separate statement at each grade level, variations in the qualifications required are reflected in the statements covering nature and scope of work and level of responsibility.

NOTES TO USERS OF THIS STANDARD

1. The nature and scope of the knowledge and experience of an individual geographer may influence the dimensions of his position. This will be reflected in the complexity of the assignments he receives and the responsibility and authority with which he performs them. It is intended that the classification criteria measure this relationship.

   Care should be taken to avoid evaluating positions on the basis of isolated or atypical assignments. Rather, the overall scope of the work should be considered. For example, a geographer may be concerned with successively small areas of the earth which, in totality, may extend the scope of the work to continental or worldwide proportions, provided the areas are part of an overall or continuing study or research rather than separate, isolated and unrelated assignments.

2. The size of the area of the earth and the variety of phenomena involved in geographic work

are not absolutes. The physical size of an area may mean little in and of itself. A heavy concentration of economic or political conditions in a small area expands the size of the area beyond its size in square miles. Western Europe, to the economically or politically oriented geographer, is "larger" than Siberia. Similarly, New York City, because of the many urban problems there, is far greater than any comparable sized area in the United States for the geographer concentrating on urban conditions. (*Note:* In all cases throughout the standard where specific areas of the earth are named, the reference is to conditions typical of the area in 1963.)

3. Grade-level criteria for positions above the GS-13 level are not included in this standard because these positions are few in number and highly individualized. In accordance with general classification principles, the absence of specific criteria does not preclude the classification of nonsupervisory geographer positions to higher levels by extension of the criteria in this standard.

GEOGRAPHER, GS-0150-05

GS-5 geographers perform a variety of tasks which are planned to provide experience and training in the application of basic professional knowledges in geography, and to develop their capacity for more responsible work.

Geographers at this level are usually engaged in the collection and identification of geographic information from specified source material in accordance with specific instructions and established procedures. These tasks are typically concerned with particular features or events and are not related one to the other. For example, information gathered may concern the exact location and place names of physical and cultural features, population changes during a specific time period in a given place or area, changes in topographic features, etc. This information is used by persons at higher grade levels in the completion of various projects or segments of projects, thereby freeing them from routine factfinding and data collection activities. Geographers at this level receive close guidance and their work is reviewed during, and after performance. However, as the geographer gains experience, the simpler assignments are not reviewed during performance.

Work at this level requires basic knowledge of the principles of geography, basic knowledge of world geography, and familiarity with various graphic methods of depicting the location and distribution of phenomena.

GEOGRAPHER, GS-0150-07

Assignments at this level, while limited in coverage and complexity, are broader in scope and are performed with more independence than at GS-5. Work is typically performed in the capacity of an assistant, but greater experience, and the ability to function more independently within a narrow scope, allows the GS-7 geographer to perform a wider variety of tasks and thereby render

greater assistance to incumbents of higher-grade positions than does the geographer at GS-5. Assignments are performed in accordance with specific instructions or established procedures. Work is subject to review upon completion, but is not reviewed during progress unless unexpected difficulties arise.

Typically, work at this level, whether concerned with geographic studies or research, involves compiling basic geographical facts, which the incumbent selects and evaluates, from a variety of specified sources. The particular geographic information required is drawn from specified maps, charts, and other source materials in accordance with established procedures and criteria. Discrepancies in data are ascertained, simpler discrepancies remedied; and information is presented in the most useful format, given the nature of the overall project.

Geographers at this level are familiar with a variety of basic geographic tools and sources.

GEOGRAPHER, GS-0150-09

GS-9 geographers are engaged either in taxonomic and descriptive work of fairly substantial scope and complexity, or in analytic and interpretive work of relatively limited scope and complexity.

Research work at this level is typically performed under close supervision and involves responsibility for segments of the research process which are integrated into the overall project. This is distinguished from work involving the full scope of the research process as described at the GS-11 level.

Geographers doing taxonomic and descriptive work have independent responsibility for small projects or significant segments of larger projects. Their assignments have value as independent units of work, although they are often part of larger projects. This should be distinguished from assignments at the GS-7 level which do not typically represent complete projects or work units.

The following illustrate taxonomic and descriptive work typical of the GS-9 geographer: (1) Locates, examines, evaluates and selects, from a variety of graphic, textual and other source material, information necessary for use in accurately depicting the location and standardizing the nomenclature of physical and human features on a map, chart or in a gazetteer. Such work generally covers an area the size and complexity of France, and involves a large variety of phenomena that are fairly easily differentiated from one another in accordance with established procedures and criteria. (2) Compiles and synthesizes geographic data as part of a study showing and/or comparing the distribution of various phenomena. Determines the distribution of like phenomena (e.g., deciduous vegetation or precipitation) over Eastern United States, or compares the distribution of two or three different kinds of phenomena, e.g., deciduous vegetation and precipitation, in an area the size of California. Distributive information is typically presented in a graphic or a statistical manner.

Problems may arise from discrepancies in source material. Although the most difficult problems are resolved at a higher level, the GS-9 geographer is expected to use his judgment in evaluation of the evidence to resolve such problems. Completed taxonomic and descriptive work is reviewed for thoroughness, accuracy, adequacy of planning, soundness of judgment in establishment and organization of geographic facts and for conformance to established procedures.

Analytical and interpretive work at the GS-9 level is characteristically that of assistance to a higher-graded researcher whose assignment is broad enough in scope to allow the segmenting of the research into small, self-contained studies. The GS-9 geographer doing such work will normally receive extensive and precise instructions, and the project leader will be readily available for consultation and guidance. Finished work will be thoroughly checked for reliability, reasoning, and technique.

The following kinds of knowledge and skills are considered as being within the purview of the GS-9 level: (1) the ability to read and interpret maps, charts, photographs and statistical tabulations; (2) the ability to integrate geographical information for presentation from a regional or topical viewpoint; (3) the ability to present and illustrate geographic information in narrative and graphic form; (4) the ability to use basic statistical methods; and (5) the ability to carry out basic field research including the mapping of phenomena.

GEOGRAPHER, GS-0150-11

Geographers at this level may be responsible for descriptive and/or taxonomic studies which involve greater coverage and complexity than those described at the GS-9 level, or they may be engaged in responsible analytic and interpretive work.

Taxonomic and descriptive work

Taxonomic and descriptive assignments typical of this level require a high degree of independent planning and performance. They are difficult, but usually involve established methodology and conventional technique. Assignments are broad in scope in that they involve working with a large geographic area, a wide variety of geographic facts, or a combination of both. The nature of the work tends to circumscribe the amount of discretion used regarding method of attack, the techniques to be used and the manner of presentation. However, departure from standard procedures occurs frequently and the exercise of judgment is required in making factual determinations and technical presentation determinations. The supervision received consists of assignment of work, instructions in new or revised policies or procedures, and advice, as requested, with respect to such problems as the applicability of modified or new methods and techniques to unusual cases.
Typical descriptive and taxonomic assignments are as follows:

(1) Assembles information concerning the location and nomenclature of physical and cultural

phenomena covering an area the size of Canada, and makes determinations in the more difficult cases regarding location and nomenclature to appear on a map, chart or in a gazetteer to insure standardization of such information for logistic, navigation, intelligence, or other purposes. Geographers engaged in this work are not typically concerned with relationships existing among phenomena. However, the phenomena must be differentiated from one another for the purpose of categorization and designation. This often involves features that are very similar, but capable of being distinguished. Procedures and precedents are of little use in such cases. Geographers at this level assist in, or may be partly responsible for, changing and modifying established procedures and precedents. Also, determinations regarding location and nomenclature must often be made despite conflicting information or a lack of dependable information.

(2) Compiles and synthesizes geographic data to show and compare the distribution of various features and events over an area about the size of Argentina. While work at GS-9 is likely to be characterized by a distribution study of like phenomena, at GS-11 the scope of assignment typically involves comparing the distribution of a variety of features and/or events, although determining the distribution of like phenomena is generally a first step. Typically, the distribution of three or four different kinds of phenomena (e.g., precipitation, temperature, vegetation, and settlements) are compared and presented in an easy to read graphic and statistical form.

(3) Compiles and synthesizes a wide variety of geographic data as part of a comprehensive study of all significant physical and human phenomena in an area or region the size and complexity of Uruguay. The study typically involves descriptive writing and the use of maps and statistics for presenting and emphasizing location and distribution data plus geographic relationships that are known or easily discerned from available data. The most difficult aspects of such an assignment are choice of available and reliable source material, and meaningful synthesis and presentation of information.

Analytic and interpretive work

GS-11 is the first level at which responsibility occurs for analytic and interpretive work representing the full scope of the research process, including defining the problem, making hypotheses, planning the investigative methods; initiating and carrying out the investigation, getting vital information in order, interpreting the findings and preparing final reports. Analytic and interpretive assignments are oriented toward discovering new geographic information and putting existing information in a new perspective. Such knowledge may be for use in effectively carrying out programs having economic, defense, intelligence, political and demographic implications. Such assignments are specifically assigned and the full scope of the research process is independently executed, except for conferring with supervisors at intermediate stages to assure that the approaches taken are effective and sound. Incumbents engaged in the full scope of the

research process may be part of a small team which includes persons at higher grade levels. Although involving the full scope of the research process, work at this level is distinguished from analytic and interpretive work at GS-12 in that it is concerned with fewer kinds of geographic fact and is performed with less independence. The size of the area with which geographers are concerned may vary from small to large depending upon how exhaustive is the research and the specific reliability desired.

Incumbents at GS-11 will typically be concerned with determining and explaining the interrelationships existing between or among two or three varieties of phenomena. Although interested in the significance of the geographic interrelationship or changes they are studying, GS-11 geographers do not generally make determinations with respect to the significance of geographic interrelationships and processes of change to agency activities. The following are examples of the interrelationships and the varieties of phenomena which may concern incumbents doing analytic and interpretive work:

(1) The relationship to a trade area of population distribution and land use.

(2) The relationship in a locality of vertical and horizontal wind velocity, and air and soil temperature.

(3) The impact on an area's natural landscape of land tenure, land use, and settlement patterns.

As at GS-12, incumbents of positions at this level maintain personal work contacts with geographers and persons in other disciplines and areas of endeavor whose findings they use. Personal work contacts are made within and outside the Federal service to resolve problems, to provide a free flow of information in their area of competence, to acquire information in a related geographic program, and to keep abreast of geographic developments.

GEOGRAPHER, GS-0150-12

Typical of this level is responsibility for comprehensive and definitive taxonomic and descriptive work, or for performance of analytical and interpretive assignments of considerable significance and complexity. GS-12 geographers have a high degree of competence in a topical or program area enabling them to perform difficult, and sometimes highly specialized, work with considerable authority. This is frequently evidenced by the publication of papers dealing with problems, findings, or determinations which are recognized as having considerable significance in the field.

Incumbents collaborate with their superiors in planning future projects, either for accomplishment within the organization or on a contract basis, and make recommendations as to the feasibility of proposed projects and the necessity for new phases of existing projects. Apart from program

policy, formal guidelines do not exist at this level. Good judgment, widely recognized and acknowledged study and research procedures, geographical and related publications, and insights obtained from exchanging ideas with other geographers and persons in related fields comprise the only guidelines.

Taxonomic and descriptive work

The difficulty of descriptive and taxonomic studies at this level is typified by the following examples:

(1) Responsibility for determining location and nomenclature of geographic features and assembling such information for use on maps, charts, or in gazetteers. GS-12 geographers engaged in this kind of work are recognized experts on the location and nomenclature of all physical and human features regarded as significant for navigational, intelligence, logistic and general geographical use. Their competence generally extends to an entire continent or an area of similar scope. Increased complexity results from responsibility for coordinating operational aspects of the studies involved and responsibility, subject only to supervisory approval, for developing procedures and precedents to be used by geographers or others at lower grades.

(2) Responsibility for a comprehensive descriptive study of the significant geographical aspects of a major nation state, e.g., Brazil, involving the bringing together of numerous available facts and their presentation in narrative, graphic and statistical form. Such studies may report existing knowledge about the interrelationships and significance of geographic fact to the natural and cultural landscape but are not involved in determining their interrelationships and significance, as would be characteristic of analytic and interpretive work. Such an assignment differs from GS-11 by reason of the increased size and complexity, including the number and variety of phenomena involved in the area studied.

Analytic and interpretive work

Characteristically, analytic and interpretive work at this level consists of the collection, evaluation, analysis, interpolation and correlation of data (a) to ascertain and interpret the interrelationships existing among various physical and/or human phenomena or the processes of geographic change, and (b) to determine the significance of the interrelationships or processes of change to agency activities.

Work differs from that described at GS-11 in that (1) it is more extensive in scope and importance, (2) it involves a greater variety of geographic phenomena, or (3) it involves making determinations regarding the significance of geographic interrelationships and the processes of

change to agency activities. For example:

(a) At GS-11, an analysis may involve the relationships to a trade area of population distribution and land use; at this level the analysis will incorporate additional factors, such as resources, productivity, and patterns of consumption.

(b) At GS-11, an analysis may involve the relationship in a locality of vertical and horizontal wind velocity and air soil temperature; at this level the analysis will incorporate the additional relationships of these factors to vegetation or land use.

(c) At GS-11, an analysis may involve the impact on an area's natural landscape of land tenure and land use patterns; at this level the analysis will incorporate additional factors such as climate and settlement patterns, and the interrelationships of all the above factors on the area's economy.

GS-12 incumbents are responsible not only for the factual accuracy of their results but for the thoroughness of their research and the validity of their interpretations. GS-11 geographers engaged in analytic and interpretive work, on the other hand, do not bear such responsibility, but confer with their supervisors at intermediate stages to assure that the approaches taken are effective and sound.

Personal work relationships are substantially the same as those at the GS-11 level.

GEOGRAPHER, GS-0150-13

Assignments at GS-13 involve the initiation, formulation, planning, and control of major research projects or geographical programs which are critical to the organization. Geographers at this level typically receive their assignments in terms of general objectives; their technical decisions are authoritative; and they are generally recognized as the organization's experts in their field. Supervision received at this level is administrative in nature and work is received usually only for timeliness and appropriateness.

Geographers at the GS-13 level normally do not engage in simple description or in the classification of geographic observations by established systems, except insofar as such work is part of a larger and more complex project requiring the analysis and interpretation of the data. The development of a new taxonomic system or the extensive alteration of an existing system would, of course, represent such a large and complex effort. Such an assignment, however, would be a rare, one-of-a-kind sort of project.

Typically, GS-13 geographers evolve and test hypotheses to clarify complex and often obscure causal relationships and examine geographic processes to understand their nature and assess their impact upon agency programs. They prepare authoritative and comprehensive reports based upon

personal observations as well as upon the synthesis and analysis of a wide variety of established geographic data drawn from related studies and research. The guidelines are similar to those at GS-12. Work at this level often involves novel problems of research, investigations involving a subject in which little work has been done, or difficulties of a similar complexity. The following are examples of assignments characteristic of the GS-13 level:

(1) The examination and analysis of long-period weather patterns prior to periods of extreme cold or amounts of precipitation, in areas where this is not the normal climatic condition, to establish causal relationships leading to predictability criteria beneficial to commerce, agriculture or defense.

(2) Analytic and comparative studies to define geographic areas throughout the nation which can be used as accurate, representative samples in enumerating and comparing statistical data reflecting a variety of current demographic, economic and social conditions. Such areas are likely to cut across political and administrative lines; the problem is to identify areas which are truly representative of the nation as a whole with respect to the matters under study.

(3) Determining the frequency and intensity of distribution of dust at a particular area of the earth, including the size of dust particles, the material composition of dust and the abrasiveness of dust, for use in the development of design and use criteria for military or other material and equipment.

Individually, or as leaders of small teams, GS-13 geographers develop and carry out assigned projects with broad discretion to act within the limitation of available funds and major program goals. They analyze and evaluate studies and research proposals of complexity similar to that described at this level and make recommendations for contracting research. They monitor studies and research done under contract to insure that agency needs are fulfilled. Characteristically, supervisors are not available for consultation and advice and may not be directly concerned with the immediate project. Completed work is accepted as technically accurate and is reviewed only in terms of policy conformance and the accomplishment of objectives.

Personal investigation is sometimes a prerequisite if exhaustive and highly reliable work is to be done. Although field studies may be conducted by geographers at lower levels, they are not concerned with so large or novel an area of the field of geography, are not involved with interrelations where the impact of one or more varieties of geographic fact on other geographic or closely related fact is difficult to measure and understand, and do not require an extensive knowledge of related social and/or physical sciences to understand the interrelationships or ascertain the processes of geographic change.

GS-13 geographers establish and maintain liaison with persons in and outside the Government

service. They typically attend formal and informal meetings and conferences as representatives of their agencies to present authoritative geographical information, to explain agency programs and to exchange mutually beneficial information. Although more typical at higher levels, geographers at this level may initiate, plan, organize and conduct such meetings.